CERTIFICATE OF MAILING

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Mary Curtin

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Buenz, et al.	)	Art Unit: 2636
Serial No.: 10/647,487	)	Examiner: Brent Swarthout
Filed: August 25, 2003	)	**CUSTOMER NO. 24024**
For: **WIRELESS TIRE PRESSURE SENSING SYSTEM**	)	Attorney Docket No. 21220/04136 (202AS050 US)

Commissioner of Patents
P.O. Box 1450
Alexandria, VA 22313-1450

REQUEST TO WITHDRAW HOLDING OF ABANDONMENT

Sir:

On March 27, 2006, the United States Patent and Trademark Office (USPTO) issued a Notice of Abandonment ("The Notice") for the above-referenced application. The Notice indicates Applicants failed to timely file a proper reply to the Office letter mailed May 4, 2005 ("the Office Action").

In fact, on August 2, 2005 Applicants did file a response to the Office Action. A return-receipt postcard, which itemized a 1 page Transmittal Form and 11 page Response, was included with Applicants' response. A copy of the return-receipt postcard, which includes a "Patent and Trademark Office" date-stamp of August 4, 2005, is enclosed with this Request.

In addition, copies of Applicants' 1 page Transmittal Form and 11 page Response filed with the USPTO on August 2, 2005 are also enclosed.

Applicants believe that the evidence discussed above and enclosed herewith is sufficient to establish a timely response to the Office Action and, therefore, request withdrawal of the holding of abandonment for this application.

It is believed that no fee is due for entering this petition. However, should the Commissioner determine that a fee is due, the Commissioner is hereby authorized to charge any additional fees to deposit account no. 03-0172. A duplicate of this paper is attached.

Respectfully submitted,

Date: April 12, 2006

Brian E. Kondas

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216-622-8308

PTO/SB/21 (09-04)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Total Number of Pages in This Submission	12

Application Number	10/647,487
Filing Date	August 25, 2003
First Named Inventor	Buenz et al.
Art Unit	2367
Examiner Name	B. Swarthout
Attorney Docket Number	21220/04136 (202AS050)

ENCLOSURES *(Check all that apply)*

- ☐ Fee Transmittal Form
- ☐ Fee Attached
- ☑ Amendment/Reply
  - ☐ After Final
  - ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request
- ☐ Express Abandonment Request
- ☐ Information Disclosure Statement
- ☐ Certified Copy of Priority Document(s)
- ☐ Reply to Missing Parts/ Incomplete Application
  - ☐ Reply to Missing Parts under 37 CFR 1.52 or 1.53
- ☐ Drawing(s)
- ☐ Licensing-related Papers
- ☐ Petition
- ☐ Petition to Convert to a Provisional Application
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- ☐ After Allowance Communication to TC
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- ☐ Appeal Communication to TC (Appeal Notice, Brief, Reply Brief)
- ☐ Proprietary Information
- ☐ Status Letter
- ☑ Other Enclosure(s) (please Identify below):
  Return Receipt Postcard

Remarks

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	24024		
Signature	William E. Zitelli		
Printed name	William E. Zitelli		
Date	8/1/2005	Reg. No.	28,551

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Attorney Docket Nos.: 2122/04136 (202AS050)

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Mary Curtin

Signature: Mary Curtin

In re Patent Application of: **Buenz et al.**	)	Examiner: Brent Swarthout
Serial No.: 10/647,487	)	Art Unit: 2636
Filed: August 25, 2003	)	**CUSTOMER NO. 24024**
For: **WIRELESS TIRE PRESSURE AND/OR WHEELSPEED SENSING SYSTEM FOR AIRCRAFT**	)	Confirmation No.: 2367
	)	Attorney Docket Nos.: 21220/04136 (202AS050)

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RESPONSE TO OFFICE ACTION

INTRODUCTORY COMMENTS

In response to the Office action dated May 4, 2003, please enter the following remarks without amendment of the remaining claims 1-30 and 38-47 of the above-identified application. It is respectfully requested that the remaining claims 1-30 and 38-47 of the above-identified application be re-examined and reconsidered for allowance based on the arguments presented in the following Remarks Section.

AMENDMENTS TO THE CLAIMS

Please amend the claims of the above-identified application as follows:

Claim 1 (original): A wireless tire pressure sensing system for an aircraft, said system comprising:

dual resonant circuits mounted to a wheel of the aircraft, one resonant circuit comprising: a first variable capacitance sensor for monitoring the pressure of a tire mounted to said wheel; and a first wire loop of a first predetermined inductance coupled to said first variable capacitance sensor, and the other resonant circuit comprising: a second variable capacitance sensor operative as a reference to said first variable capacitance sensor; and a second wire loop of a second predetermined inductance coupled to said second variable capacitance sensor;

an interrogating circuit magnetically coupleable to said dual resonant circuits and operative to induce magnetically a variable frequency current in the dual resonant circuits, said one resonant circuit responding to said induced current with an E-field signal at a first resonant frequency commensurate with the capacitance of said first variable capacitance sensor, and said other resonant circuit responding to said induced current with an E-field signal at a second resonant frequency commensurate with the capacitance of said second variable capacitance sensor;

a receiving circuit E-field coupleable to said dual resonant circuits and operative to receive said E-field signals at said first and second resonant frequencies and to generate first and second signals representative thereof; and

a processing circuit coupled to said receiving circuit for processing said first and second signals to generate a compensated pressure reading of said tire.

Claim 2 (original): The system of claim 1 including a reading unit containing the interrogating circuit, the receiving circuit and the processing circuit, said reading unit including a display coupled to the processing circuit for displaying the compensated pressure reading.

Claim 3 (original): The system of claim 1 wherein the interrogating circuit, the receiving circuit and the processing circuit are disposed on a landing gear to which the aircraft wheel is mounted.

Claim 4 (original): The system of claim 3 wherein the first and second wire loops are mounted in close proximity to each other on a hubcap of the wheel; and wherein the first and second variable capacitance sensors are disposed in a common enclosure which is mounted to the rim of the wheel, the first and second wire loops being coupled through wire conductors to the first and second variable capacitance sensors, respectively, to form the first and second resonant circuits.

Claim 5 (original): The system of claim 4 wherein the common enclosure is pneumatically coupled to a pressure chamber of the tire through a cavity in the wheel rim to enable the first variable capacitance sensor to monitor the tire pressure.

Claim 6 (original): The system of claim 5 wherein the common enclosure includes: an opening in a wall thereof, said opening providing an air passageway solely to the first variable capacitance sensor; and a hollow tube coupled to said wall and enclosing said opening in the hollow portion thereof, said hollow tube disposed in the cavity of the wheel rim.

Claim 7 (original): The system of claim 4 wherein the common enclosure is vacuum sealed.

Claim 8 (original): The system of claim 3 wherein the interrogating circuit comprises: a magnetic interrogator mounted in close proximity to the first and second wire loops of the dual resonant circuits; and an oscillator circuit for driving the magnetic interrogator to generate a variable frequency magnetic field directed toward the first and second wire loops of the resonant circuits.

Claim 9 (original): The system of claim 8 wherein the first and second wire loops are mounted in close proximity to each other on a hubcap of the wheel; wherein the magnetic interrogator is mounted on an axle of the wheel in close proximity to the first and second wire loops; and wherein the oscillator circuit is mounted on a strut of the landing gear and coupled to the magnetic interrogator through wire conductors.

Claim 10 (original): The system of claim 3 wherein the receiving circuit comprises: a third wire loop mounted in close proximity to the first and second wire loops of the dual resonant circuits and operative to receive E-field signals solely within an E-field null of the magnetic coupling of the interrogator circuit, said E-field signals including E-fields at the first and second resonant frequencies; and a sensing circuit coupled to the third wire loop for converting the received E-field signals at the first and second resonant frequencies into the first and second signals representative thereof.

Claim 11 (original): The system of claim 10 wherein the first and second wire loops are mounted in close proximity to each other on a hubcap of the wheel; wherein the third wire loop is mounted on an axle of the wheel in close proximity to the first and second wire loops; wherein the sensing circuit and processing circuit are mounted on a strut of the landing gear; and wherein the sensing circuit is coupled to the third wire loop through wire conductors.

Claim 12 (original): The system of claim 1 wherein the first and second variable capacitance sensors comprise substantially identical integrated circuit structures.

Claim 13 (original): The system of claim 1 wherein the first and second variable capacitance sensors comprise micro-electro-mechanical system (MEMS) sensors.

Claim 14 (original): The system of claim 1 wherein the first and second wire loops are disposed on temperature stable material.

Claim 15 (original): The system of claim 1 wherein the first and second wire loops are disposed on a single layer of temperature stable material.

Claim 16 (original): The system of claim 1 wherein at least one of the first and second wire loops is physically trimable.

Claim 17 (original): The system of claim 1 wherein the processing circuit includes an indicator for displaying a tire pressure condition.

Claim 18 (original): The system of claim 1 wherein the indicator comprises a non-volatile indicator.

Claim 19 (original): The system of claim 1 including a phase lock loop circuit coupled to both of the interrogating circuit and receiving circuit for locking on to the first and second resonant frequencies.

Claim 20 (original): The system of claim 1 wherein the processing circuit generates the compensated pressure reading as a function of the difference of the first and second resonant frequencies.

Claim 21 (original): The system of claim 1 including an aircraft bus; and wherein processing circuit is coupled to the aircraft bus for conducting the compensated pressure reading over the aircraft bus.

Claim 22 (original): The system of claim 21 wherein the interrogating and processing circuits receive power from the aircraft bus.

Claim 23 (original): A method of wirelessly measuring pressure of a tire of an aircraft; said method comprising the steps of:

mounting first and second resonant circuits to a wheel of the aircraft to which the tire is mounted;

monitoring tire pressure with said first resonant circuit;

using said second resonant circuit as a reference to said first resonant circuit;

generating a variable frequency signal;

magnetically coupling the variable frequency signal to the first and second resonant circuits;

inducing first and second resonant frequencies in the first and second resonant circuits, respectively, by the magnetically coupled variable frequency signal, said first resonant frequency representative of an uncompensated pressure reading and said second resonant frequency signal representative of a compensation reading;

E-field coupling the first and second resonant frequencies from the first and second resonant circuits to a receiver circuit; and

generating a compensated pressure reading from the E-field coupled first and second resonant frequencies.

Claim 24 (original): The method of claim 23 including the step of phase locking the variable frequency signal to the E-field coupled first and second resonant frequencies.

Claim 25 (original): The method of claim 24 including the steps of: sweeping the variable frequency signal over a range of frequencies which include the first and second resonant frequencies; determining the variable frequency signal upon phase lock to each of the E-field coupled first and second resonant frequencies.

Claim 26 (original): The method of claim 24 including the steps of: sweeping the variable frequency signal over a range of frequencies which include the first and second resonant frequencies; dwelling the frequency sweep for a period of time at phase lock to each of the E-field coupled first and second resonant frequencies; and determining the first and second resonant frequencies during said dwell periods.

Claim 27 (original): The method of claim 23 including the step of generating a compensated pressure reading as a function of the difference between the E-field coupled first and second resonant frequencies.

Claim 28 (original): The method of claim 23 including the step of conveying the compensated pressure reading over a bus of the aircraft.

Claim 29 (original): The method of claim 23 including the step of displaying a tire pressure condition based on the compensated pressure reading on a non-volatile indicator.

Claim 30 (original): The method of claim 23 wherein the step of using includes using the second resonant circuit as a temperature compensation reference.

Cancel claims 31-37:

Claim 38 (original): A wireless tire pressure sensing system for an aircraft, said system comprising:

a resonant circuit mounted to a wheel of the aircraft, said resonant circuit comprising: a variable capacitance sensor for monitoring the pressure of a tire mounted to said wheel; and a wire loop of a predetermined inductance coupled to said variable capacitance sensor;

an interrogating circuit magnetically coupleable to said resonant circuit and operative to induce magnetically a variable frequency current in the resonant circuit, said resonant circuit responding to said induced current with an E-field signal at a resonant frequency commensurate with the capacitance of said variable capacitance sensor;

a receiving circuit E-field coupleable to said resonant circuit and operative to receive said E-field signal at said resonant frequency and to generate a signal representative thereof; and

a processing circuit coupled to said receiving circuit for processing said signal to generate a pressure reading of said tire.

Claim 39 (original): The system of claim 38 wherein the receiving circuit comprises: a second wire loop mounted in close proximity to the wire loop of the resonant circuit and operative to receive E-field signals solely within an E-field null of the magnetic coupling of the interrogator circuit, said E-field signals including E-fields at the resonant frequency; and a sensing circuit coupled to the second wire loop for converting the received E-field signal at the resonant frequency into the signal representative thereof.

Claim 40 (original): The system of claim 39 wherein the wire loop of the resonant circuit is mounted on a hubcap of the wheel; wherein the second wire loop is mounted on an axle of the wheel in close proximity to the wire loop of the resonant circuit; wherein the sensing circuit and processing circuit are mounted on a strut of the landing gear; and wherein the sensing circuit is coupled to the second wire loop through wire conductors.

Claim 41 (original): A method of wirelessly measuring pressure of a tire of an aircraft; said method comprising the steps of:

mounting a resonant circuit to a wheel of the aircraft to which the tire is mounted;

monitoring tire pressure with said resonant circuit;

generating a variable frequency signal;

magnetically coupling the variable frequency signal to the resonant circuit;

inducing a resonant frequency in the resonant circuit by the magnetically coupled variable frequency signal, said resonant frequency representative of a pressure reading;

E-field coupling the resonant frequency from the resonant circuit to a receiver circuit; and

generating a pressure reading from the E-field coupled resonant frequency.

Claim 42 (original): The method of claim 41 including the step of phase locking the variable frequency signal to the E-field coupled resonant frequency.

Claim 43 (original): The method of claim 42 including the steps of: sweeping the variable frequency signal over a range of frequencies which include the resonant frequency; determining the variable frequency signal upon phase lock to the E-field coupled resonant frequency.

Claim 44 (original): The method of claim 42 including the steps of: sweeping the variable frequency signal over a range of frequencies which include the resonant frequency; dwelling the frequency sweep for a period of time at phase lock to the E-field coupled resonant frequency; and determining the resonant frequency during said dwell period.

Claim 45 (original): The method of claim 41 wherein the step of E-field coupling includes the step of E-field coupling solely within the E-field null of the magnetic coupling to the resonant circuit.

Claim 46 (original): The method of claim 41 including the step of conveying the pressure reading over a bus of the aircraft.

Claim 47 (original): The method of claim 41 including the step of displaying a tire pressure condition based on the pressure reading on a non-volatile indicator.

Cancel claims 48-62.

REMARKS

In the Office action noted above, claims 1-30 were allowed, claims 31-37 and 48-62 were withdrawn from consideration, claims 38, 41-44 and 46-47 were rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,260,683, Tanaka et al., and dependent claims 39, 40 and 45 were considered to recite allowable subject matter. In the instant response, claims 31-37 and 48-62 are cancelled and the rejection of claims 38, 41-44 and 46-47 is respectfully traversed. The following remarks will support Applicants' position regarding the rejected claims.

Tanaka et al. is directed to a tire pressure detecting apparatus for a vehicle, which apparatus includes three coils as shown in the diagram of Figure 20 thereof. An excitation coil 99 and a receiving coil 101 are provided in the body of the vehicle for obtaining magnetic coupling with a third coil 13 which is part of a resonant circuit C1 (see col. 9, lines 10-13) at the tire. Coil 99 excites coil 13 with a magnetic flux field into a resonant frequency which is imparted via a magnetic flux field to the receiving coil 101 and used to determine the pressure of the tire. The coupling among the three coils is transformer-like using core materials for enabling conduction of the magnetic flux.

Tanaka et al. use the terms "magnetic coupling" and electromagnetic coupling" interchangeably in the text of their patent (refer to the Abstract; col. 9, lines 38-40 and col. 10, lines 10-12). However, it is clear from the description of Tanaka et al. that their design supports only magnetic coupling among the three coils. The magnetic flux field coupling is confirmed by Figure 19 which shows the excitation and receiving coils 99 and 101 wound around iron cores 103 and 105, respectively, and Figure 30 which refers to a frequency range of 15-19 kHz conducive to a magnetic flux coupling frequencies. No mention is made in Tanaka et al. of electric field coupling beyond the loose reference to "electromagnetic".

In contrast, independent claim 38 recites, in substance, that the resonant circuit responds to the induced current with an E-field signal at a resonant frequency commensurate with the capacitance of the variable capacitance sensor; a receiving circuit E-field coupleable to the resonant circuit and operative to receive the E-field signal at the resonant frequency and to generate a signal representative of the E-field signal; and a processing circuit coupled to the

receiving circuit for processing the generated E-field representative signal to generate a pressure reading of the tire.

In addition, independent claim 41 recites, in substance, the steps of: E-field coupling the resonant frequency from the resonant circuit to a receiver circuit; and generating a pressure reading from the E-field coupled resonant frequency.

This aspect of Applicants' invention recited in claims 38 and 41 is supported in Applicants' application in Figure 1 which shows an E-field loop antenna 32, E-field sensing circuit 34 and RF receiver and processing unit 20, and in paragraph 33. Note that Applicants enable the use of the E-field signal by the operational RF coupling frequency range of 14-20 mHz and the E-field loop antenna 32. No such E-field coupling capability among the operational coils is taught by Tanaka et al., nor is there any suggestion of such a coupling which could motivate someone to realize such a design. Rather, the operational frequencies referred to in Tanaka et al. of 15-19 kHz and the iron cores of the coils used in the design of Tanaka et al. lead anyone skilled in the pertinent art to an understanding that the design is one solely of transformer-like, magnetic flux coupling among the three coils. In Tanaka et al., it is solely the magnetic field coupled signal in coil 101 that is used by the detecting circuit 340 for determining tire pressure.

Accordingly, independent claims 38 and 41 both recite an inventive aspect as noted above that is patentably distinguishable from Tanaka et al. and thus, are clearly novel over and not obvious in view of Tanaka et al. As regards the rejection of claims 42-44, they all recite steps involving the E-field coupled resonant frequency which is not taught or suggested by Tanaka et al. In addition, all of the rejected dependent claims 42-44 and 46-47 are dependent from independent claim 41 and include all of the limitations thereof. Therefore, they also are novel over and non-obviousness in view of Tanaka et al. for at least the same reasons given above for their parent claim 41.

In view of the above, it is respectfully requested that the obviousness rejections of claims 38, 41-44 and 46-47 be withdrawn. Applicants acknowledge that dependent claims 39, 40 and 45 are all considered allowable, but are taking no action at this time regarding these claims because they contend that all of the claims 38-47 are allowable.

On another matter, Applicants filed an IDS and form PTO/SB/08A disclosing some 22 references with the instant application (i.e. 8/25/03). The examiner has made no reference to this disclosure in the Office action nor has he provided an initialed copy of the form PTO/SB/08A as an indication of his review of the disclosed references in connection with the examination of the instant application. Accordingly, Applicants respectfully request an initialed copy of the form PTO/SB/08A as an indication of his review of the disclosed references at the earliest opportunity.

Since the application is considered in condition for allowance, an early issuance thereof is earnestly solicited. While Applicants believe that no additional fees are due the Office at this time, the Commissioner is hereby authorized to charge any additional related fees, or credit any overpayments, to Deposit Account No. 03-0172.

Respectfully submitted,

William E. Zitelli
Attorney for Applicants
Reg. No. 28,551

Deposited with the United States Postal Service with sufficient postage via U.S. First Class mail in an envelope addressed to Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on August 2, 2005.

Re:	U.S. Patent Application of Buenz et al.
For:	**WIRELESS TIRE PRESSURE AND/OR WHEELSPEED SENSING SYSTEM FOR AIRCRAFT**
Serial No.:	10/647,487
Filed:	August 25, 2003
Docket No.	21220/04136 (202AS050)

Please acknowledge receipt of the following:

- Transmittal Form (1 pg.)
- Response (11 pgs)
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